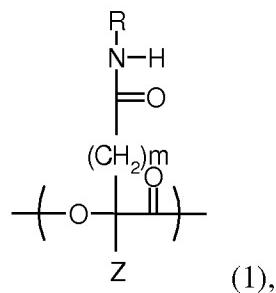


C. Claims

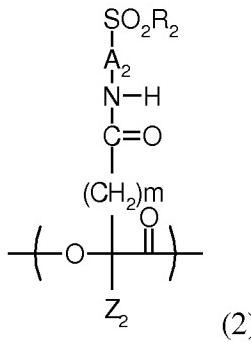
The following is a complete listing of the claims, and replaces all earlier versions and listings.

1. (Previously Presented) A polyhydroxyalkanoate comprising at least a unit represented by a chemical formula (1) within a molecule:

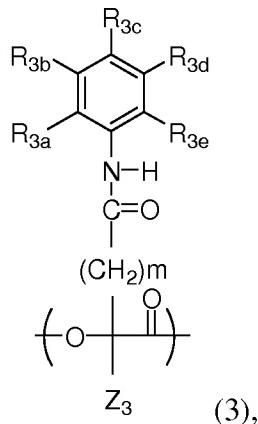


wherein R represents $-A_1-SO_2R_1$; R_1 represents OH, a halogen atom, ONa, OK or OR_{1a}; R_{1a} and A_1 each independently represents a group having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure or a substituted or unsubstituted heterocyclic structure; m represents an integer selected from 0-8; Z represents a linear or branched alkyl group, an aryl group or an aralkyl group substituted with an aryl group; and in case plural units are present, R, R₁, R_{1a}, A₁, m and Z have the aforementioned meanings independently for each unit.

2. (Previously Presented) The polyhydroxyalkanoate according to claim 1, comprising, as the unit represented by the chemical formula (1), at least a unit represented by a chemical formula (2), a chemical formula (3), a chemical formula (4A) or (4B), within a molecule:

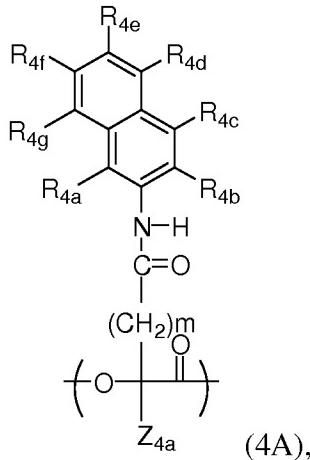


wherein R_2 represents OH, a halogen atom, ONa, OK or OR_{2a}; R_{2a} represents a linear or branched alkyl group with 1 to 8 carbon atoms or a substituted or unsubstituted phenyl group; A₂ represents a linear or branched alkylene group with 1 to 8 carbon atoms; m represents an integer selected from 0 - 8; Z₂ represents a linear or branched alkyl group, an aryl group or an aralkyl group substituted with an aryl group; and in case plural units are present, A₂, R₂, R_{2a}, m and Z₂ have the aforementioned meanings independently for each unit;



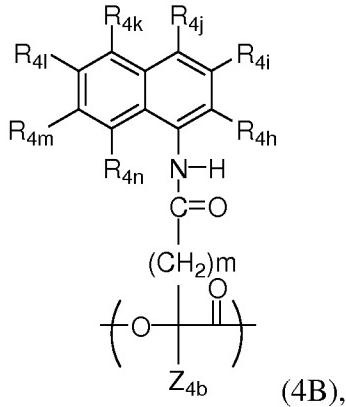
wherein R_{3a}, R_{3b}, R_{3c}, R_{3d} and R_{3e} each independently represents SO₂R_{3f} (R_{3f} representing OH, a halogen atom, ONa, OK or OR_{3f1} (R_{3f1} representing a linear or branched alkyl group with 1 to 8 carbon atoms or a substituted or unsubstituted phenyl group)), a

hydrogen atom, a halogen atom, an alkyl group with 1 - 20 carbon atoms, an alkoxy group with 1 - 20 carbon atoms, an OH group, an NH₂ group, an NO₂ group, COOR_{3g} (R_{3g} representing a H atom, a Na atom or a K atom), an acetamide group, an OPh group, a NHPH group, a CF₃ group, a C₂F₅ group or a C₃F₇ group (Ph indicating a phenyl group), of which at least one is SO₂R_{3f}; m represents an integer selected from 0 - 8; Z₃ represents a linear or branched alkyl group, an aryl group or an aralkyl group substituted with an aryl group; and in case plural units are present, R_{3a}, R_{3b}, R_{3c}, R_{3d}, R_{3e}, R_{3f}, R_{3f1}, R_{3g}, m and Z₃ have the aforementioned meanings independently for each unit;



wherein R_{4a}, R_{4b}, R_{4c}, R_{4d}, R_{4e}, R_{4f} and R_{4g} each independently represents SO₂R_{4o} (R_{4o} representing OH, a halogen atom, ONa, OK or OR_{4o1} (R_{4o1} representing a linear or branched alkyl group with 1 to 8 carbon atoms or a substituted or unsubstituted phenyl group)), a hydrogen atom, a halogen atom, an alkyl group with 1 - 20 carbon atoms, an alkoxy group with 1 - 20 carbon atoms, an OH group, an NH₂ group, an NO₂ group, COOR_{4p} (R_{4p} representing a H atom, a Na atom or a K atom), an acetamide group, an OPh

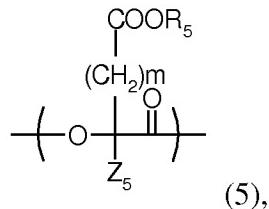
group, an NHPh group, a CF₃ group, a C₂F₅ group or a C₃F₇ group (Ph indicating a phenyl group), of which at least one is SO₂R_{4o}; m represents an integer selected from 0 - 8; Z_{4a} represents a linear or branched alkyl group, an aryl group or an aralkyl group substituted with an aryl group; and in case plural units are present, R_{4a}, R_{4b}, R_{4c}, R_{4d}, R_{4e}, R_{4f}, R_{4g}, R_{4o}, R_{4o1}, R_{4p}, m and Z_{4a} have the aforementioned meanings independently for each unit;



wherein R_{4h}, R_{4i}, R_{4j}, R_{4k}, R_{4l}, R_{4m} and R_{4n} each independently represents SO₂R_{4o} (R_{4o} representing OH, a halogen atom, ONa, OK or OR_{4o1} (R_{4o1} representing a linear or branched alkyl group with 1 to 8 carbon atoms or a substituted or unsubstituted phenyl group)), a hydrogen atom, a halogen atom, an alkyl group with 1 - 20 carbon atoms, an alkoxy group with 1 - 20 carbon atoms, an OH group, an NH₂ group, an NO₂ group, COOR_{4p} (R_{4p} representing a H atom, a Na atom or a K atom), an acetamide group, an OPh group, an NHPh group, a CF₃ group, a C₂F₅ group or a C₃F₇ group (Ph indicating a phenyl group), of which at least one is SO₂R_{4o}; m represents an integer selected from 0 - 8; Z_{4b} represents a linear or branched alkyl group, an aryl group or an aralkyl group substituted with an aryl group; and in case plural units are present, R_{4h}, R_{4i}, R_{4j}, R_{4k}, R_{4l}, R_{4m}, R_{4n}, R_{4o},

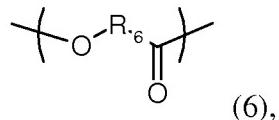
R_{401} , R_{4p} , m and Z_{4b} have the aforementioned meanings independently for each unit.

3. (Withdrawn) A polyhydroxyalkanoate comprising at least a unit represented by a chemical formula (5) within a molecule:



wherein R_5 represents hydrogen, a group capable of forming a salt or R_{5a} ; R_{5a} represents a linear or branched alkyl group with 1 - 12 carbon atoms, an aralkyl group or a substituent having a sugar; m represents an integer selected from 0 - 8; Z_5 represents a linear or branched alkyl group, an aryl group or an aralkyl group substituted with an aryl group; however R_5 only represents a substituent having a sugar in case Z_5 is a methyl group and m is 0 - 1; and in case plural units are present, R_5 , R_{5a} , m and Z_5 have the aforementioned meanings independently for each unit.

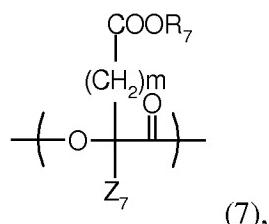
4. (Previously Presented) The polyhydroxyalkanoate according to claim 1, further comprising a unit represented by a chemical formula (6) within a molecule:



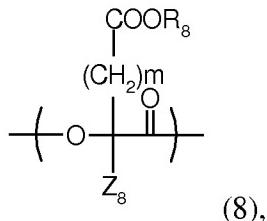
wherein R_6 represents a linear or branched alkylene with 1 - 11 carbon

atoms, alkyleneoxyalkylene group (each alkylene group being independently with 1 - 2 carbon atoms), a linear or branched alkenyl group with 1 - 11 carbon atoms or an alkylidene group with 1 - 5 carbon atoms which may be substituted with an aryl group; and in case plural units are present, R₆ has the aforementioned meanings independently for each unit.

5. (Withdrawn) A method for producing a polyhydroxyalkanoate comprising a unit represented by a chemical formula (8), of the method comprising a step of executing hydrolysis of a polyhydroxyalkanoate comprising a unit represented by a chemical formula (7) in the presence of an acid or an alkali, or a step of executing hydrogenolysis comprising a catalytic reduction of a polyhydroxyalkanoate comprising a unit represented by a chemical formula (7):



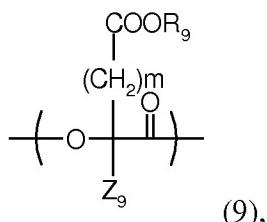
wherein R₇ represents a linear or branched alkyl group with 1 - 12 carbon atoms or an aralkyl group; m represents an integer selected from 0 - 8; Z₇ represents a linear or branched alkyl group, an aryl group or an aralkyl group substituted with an aryl group, and m represents an integer selected from 2 - 8 in case Z₇ is a methyl group; and in case plural units are present, R₇, m and Z₇ have the aforementioned meanings independently for each unit;



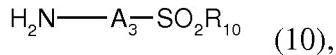
wherein R₈ represents hydrogen, or a group capable of forming a salt; m represents an integer selected from 0 - 8; Z₈ represents a linear or branched alkyl group, an aryl group or an aralkyl group substituted with an aryl group, and m represents an integer selected from 2 - 8 in case Z₈ is a methyl group; and, in case plural units are present, R₈, m and Z₈ have the aforementioned meanings independently for each unit.

6. (Withdrawn) A method for producing a polyhydroxyalkanoate

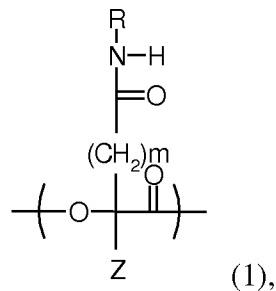
comprising a unit represented by a chemical formula (1), the method comprising a step of executing a condensation reaction of a polyhydroxyalkanoate comprising a unit represented by a chemical formula (9) and an amine compound represented by a chemical formula (10):



wherein R₉ represents hydrogen, or a group capable of forming a salt; m represents an integer selected from 0 - 8; Z₉ represents a linear or branched alkyl group, an aryl group or an aralkyl group substituted with an aryl group; and, in case plural units are present, m, R₉ and Z₉ have the aforementioned meanings independently for each unit;



wherein R_{10} represents OH, a halogen atom, ONa, OK or OR_{10a}; R_{10a} and A₃ each independently is selected from a group having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure, or a substituted or unsubstituted heterocyclic structure; and, in case plural units are present, R₁₀, R_{10a} and A₃ have the aforementioned meanings independently for each unit;



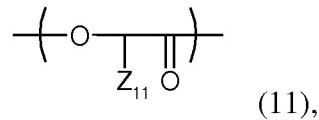
wherein R represents -A₁-SO₂R₁; R₁ represents OH, a halogen atom, ONa, OK or OR_{1a}; R_{1a} and A₁ each independently represents a group having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure or a substituted or unsubstituted heterocyclic structure; m represents an integer selected from 0-8; Z represents a linear or branched alkyl group, an aryl group or an aralkyl group substituted with an aryl group; and in case plural units are present, R, R₁, R_{1a}, A₁, m and Z have the aforementioned meanings independently for each unit.

7. (Withdrawn) A method for producing a polyhydroxyalkanoate

comprising a unit represented by a chemical formula (13), the method comprising:

a step of reacting a polyhydroxyalkanoate comprising a unit represented by a chemical formula (11) with a base; and

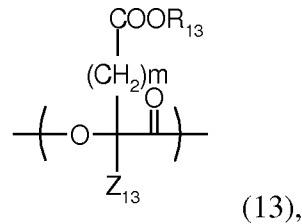
a step of reacting a compound obtained in the aforementioned step with a compound represented by a chemical formula (12):



wherein Z_{11} represents a linear or branched alkyl group, an aryl group or an aralkyl group substituted with an aryl group; and in case plural units are present, Z_{11} has the aforementioned meanings independently for each unit;



wherein m represents an integer selected from 0 - 8; X represents a halogen atom; and R_{12} represents a linear or branched alkyl group with 1 - 12 carbon atoms or an aralkyl group;



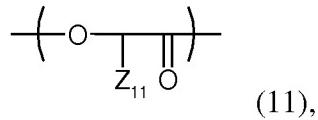
wherein m represents an integer selected from 0 - 8; R_{13} represents a linear or branched alkyl group with 1 - 12 carbon atoms or an aralkyl group; Z_{13} represents a

linear or branched alkyl group, an aryl group or an aralkyl group substituted with an aryl group, and m represents an integer selected from 2 - 8 in case Z₁₃ is a methyl group; and in case plural units are present, R₁₃, m and Z₁₃ have the aforementioned meanings independently for each unit.

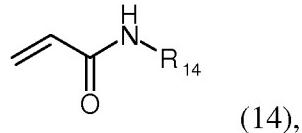
8. (Withdrawn) A method for producing a polyhydroxyalkanoate comprising a unit represented by a chemical formula (15), the method comprising;

a step of reacting a polyhydroxyalkanoate comprising a unit represented by a chemical formula (11) with a base; and

a step of reacting a compound obtained in the aforementioned step with a compound represented by a chemical formula (14):

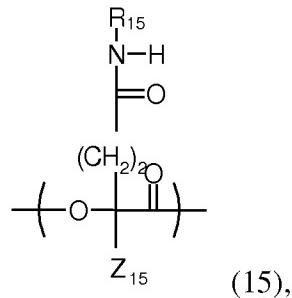


wherein Z₁₁ represents a linear or branched alkyl group, an aryl group or an aralkyl group substituted with an aryl group; and in case plural units are present, Z₁₁ has the aforementioned meanings independently for each unit;



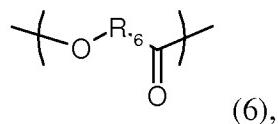
wherein R₁₄ represents -A₁₄-SO₂R_{14a}; R_{14a} represents OH, a halogen atom, ONa, OK or OR_{14b}; R_{14b} and A₁₄ each independently is selected from a group having a

substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure or a substituted or unsubstituted heterocyclic structure; and in case plural units are present, R₁₄, R_{14a}, R_{14b}, and A₁₄ have the aforementioned meanings independently for each unit;



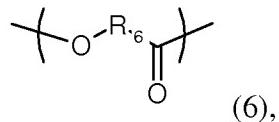
wherein R₁₅ represents -A₁₅-SO₂R_{15a}; R_{15a} represents OH, a halogen atom, ONa, OK or OR_{15b}; R_{15b} and A₁₅ each independently represents a group having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure or a substituted or unsubstituted heterocyclic structure; Z₁₅ represents a linear or branched alkyl group, an aryl group or an aralkyl group substituted with an aryl group; and in case plural units are present, R₁₅, R_{15a}, R_{15b}, and A₁₅ have the aforementioned meanings independently for each unit.

9. (Previously Presented) The polyhydroxyalkanoate according to claim 2, further comprising a unit represented by a chemical formula (6) within a molecule:



wherein R₆ represents a linear or branched alkylene with 1 - 11 carbon atoms, alkyleneoxyalkylene group (each alkylene group being independently with 1 - 2 carbon atoms), a linear or branched alkenyl group with 1 - 11 carbon atoms or an alkylidene group with 1 - 5 carbon atoms which may be substituted with an aryl group; and in case plural units are present, R₆ has the aforementioned meanings independently for each unit.

10. (Withdrawn) The polyhydroxyalkanoate according to claim 3, further comprising a unit represented by a chemical formula (6) within a molecule:



wherein R₆ represents a linear or branched alkylene with 1 - 11 carbon atoms, alkyleneoxyalkylene group (each alkylene group being independently with 1 - 2 carbon atoms), a linear or branched alkenyl group with 1 - 11 carbon atoms or an alkylidene group with 1 - 5 carbon atoms which may be substituted with an aryl group; and in case plural units are present, R₆ has the aforementioned meanings independently for each unit.